XL. *Extract of a Letter from* John Ellis, *Eſquire, F. R. S. to Dr.* Linnæus, *of* Upſal, *F. R. S. on the Animal Nature of the Genus of Zoophytes, called Corallina.*

Read July 9, 1767. I HAVE now finiſhed a collection of that genus of Zoophytes, which you call Corallina; and, with the aſſiſtance of our learned friend Dr. Solander, have made a deſcription of each ſpecies: to do this with more exactneſs, I have taken care to diſſect them minutely, and to paſs them in review under his eye in the microſcope, in order to eſtabliſh a true general character of this genus.

I have attended more particularly to examine the nature of theſe bodies, in order to confute the opinions of ſome late writers on Zoophytes, who, for want of good microſcopes, and a proper care in chemically analyſing them, have aſſerted that they were mere vegetables.

The firſt of theſe is Dr. Job Baſter, of Zeeland, who, in the Philoſophical Tranſactions, Vol. LII. p. 111, aſſerts that the Corallines of Linnæus, which he ſays he has accurately examined, are moſt evidently true plants of the genus of Conferva; becauſe there are no polypes coming out of their tops, and that they have ſeed incloſed in their cells like other marine

rine plants *. But, as another part of this letter is intended for an inquiry into this new diſcovery of Dr. Baſter's, that Corallines are Confervas; a thing never known even to the great Mr. Ray, Dr. Dillenius, or any other botaniſt, I ſhall now proceed to his ingenious friend Dr. Pallas of Berlin, who has lately reſided in Holland, and who has taken great pains in collecting every thing that has been wrote on the ſubject of Zoophytes, from whence he has compiled a book called Elenchus Zoophytorum, where he has ranged the ſeveral genera and ſpecies of this claſs of beings in a ſyſtematical order.

When he comes to the genus of Corallina, he ſays (vide Pallas Elenchus, p. 418.) †, "They are to "be left to the botaniſts, as they belong to the vegeta- "ble kingdom; but makes this apology for inſerting "them, leaſt his book ſhould be thought imperfect, "as Linnæus and Ellis have ranked them as "Zoophytes in their works."

* Corallinas, non Zoophyta, quamvis Linnæus iiſdem adnumeret, ſed veras e confervarum genere plantas eſſe, luculentiſſime perſpexi. Nunquam in earum apicibus polypi inveniuntur: ſemen contra cellulis incluſum eodem quo aliæ plantæ marinæ modo produnt. Phil. Tranſ. Vol. LII. p. 3.

† Corallinas ad vegetabilia referendas eſſe. Mihi vero totum hocce genus botanicis relinquendum videtur. Nec enim ſtructurâ, nec chymicis principiis ad Zoophytorum ullum genus accedunt, et pleræque ſpecies etiam habitum prorſus peculiarem habent, aliquæ ad fucos potius accedentes, plurimæ confervis comparabiles, quamvis lapideſcenti ſubſtantia ab iiſdem et omnibus vegetabilibus diſtinctiſſimæ. Pallas Elenchus Zoophyt. p. 418.

He

He begins with obſerving, that they don't come near to any one genus of Zoophytes, neither in their ſtructure nor chemical principles; that ſome ſpecies have a peculiar appearance, ſome approach to Fucus's, many are like Confervas; but that all of them are very diſtinct from them, and from all vegetables, on account of their lapideſcent ſubſtance.

That they differ in their chemical principles from Zoophytes; for when they are burnt, they ſmell like vegetables: and that, according to Count Marſigli's Experiments (Hiſt. Mar. p. 73.) they neither contain a volatile ſalt, or animal oil.

That the pores, in their calcareous ſubſtance, are too ſmall for polypes to inhabit them; and that the pores of Fucus's prove them to be as much animals as the Corallines, even when their pores are rendered more viſible, by having the calcareous ſubſtance, that ſurrounds them, diſſolved by an acid.

That the great Juſſieu, in his diligent reſearches after marine productions could ſee no viſible token of life in them.

That Mr. Meeſe, who has lately wrote a Flora Friſica, has found a Coralline growing upon a heath in Frieſland; which, Dr. Pallas ſays, is a ſtrong proof of their vegetable origin.

Laſtly, that their fructification is ſo nearly analagous to thoſe of Fucuſes and Confervas, that he likewiſe takes that to be a proof of their belonging to the vegetable kingdom.

To proceed then. — Dr. Pallas, after telling us that Corallines are vegetables, ſays, that ſome of them are like Fucuſes.

In

In this I muſt agree with him; becauſe his firſt Coralline, which he calls Corallina Pavonia, is truly of that genus of plants: this moſt elegant Fucus I have particularly deſcribed and figured (Eſſay on Corall. p. 88. T. 33. fig. *c*, *d*, *e*,); it is well known by the name of Turky-feather Fucus, and is called, in the Species Plant. p. 1630, Fucus Pavonius. What could have led Dr. Pallas into this miſtake? moſt probably thoſe beautiful farinaceous ſemi-circular ſtripes on it, which he muſt have taken for a lapideſcent or calcareous ſubſtance *, one of the moſt diſtinguiſhing characters of a Coralline, even according to his own deſcription of this genus. If he had tried this farinaceous ſubſtance with an acid, he might obſerve, that it would not ferment; it is of the ſame nature with the farina that covers many plants, for inſtance the Primula Auricula, and almoſt all the Lichenes foliacei and fruticuloſi, or Liverworts. As to their ſimilitude to the Conferva, the contrary will appear, as ſoon as I come to give the proper definitions to both theſe, and the Corallines. In the ſame paragraph he ſays, that the Corallines do not come near to any genus of Zoophytes.

How far he is miſtaken in this aſſertion, I will endeavour to prove from the following experiments.

Break a thin piece from the Corallium Anglicum, Eſſay on Corall. T. 27. N. 1. *c*. (Millepora Calcarea, Pallas Elench. p. 265.) or of the Corallium Lichenoides, Eſſay on Corall. T. 27. N. 2. *d*.; both

* Quamvis lapidiſcenti ſubſtantia ab omnibus vegetabilibus diſtinctiſſimæ. Pallas, Elench. 418.

which, Dr. Pallas, in his Elench. p. 265. has confounded together under the name of Millepora Calcarea (but which he confeſſes to be animal); and when you examine them in the microſcope, you will find in them both regular ſeries of cells, as figured in Eſſay on Cor. Tab. 27. Fig. D. Split at the ſame time one of the joints of the Corallina Officinalis of Linnæus lengthways, and you will find the ſeries of cells * correſpond in ſhape exactly with both the former; which I think proves the organization of theſe bodies to be the ſame, and conſequently animal.

Beſides theſe, compare the ſtructure of the Miriozoon of Donati, Phil. Tranſ. Vol. XLVII. p. 107. Tab. 5. (Millepora truncata, Pallas Elench. p. 249.) with thoſe of the Corallina Roſarium, and Corallina incraſſata, both which I have carefully diſſected and figured in Tab. XVII. Fig. 15, 20, &c. and there appears ſo great an affinity between their cells (and even in the opercula of the Corallina incraſſata), that it affords us reaſon to conclude with great probability, that their mouths, or ſuckers, are the ſame. It cannot be amiſs to mention the ſimilitude there is between the ſtony-jointed Corallines, and the Iſis Hippuris, or jointed black and white Eaſt Indian Coral, and the Cellularia Salicornia, Pallas Zooph. p. 61. or Bugle Coralline, Eſſay on Coral. T. 23. which two laſt are univerſally allowed to be animals: in all theſe are found the ſame kind of fibres that connect their joints, and exactly in the ſame manner.

In order to prove that theſe Corallines have a ſmell very different from vegetables, I muſt appeal to

* See Tab. XVII. fig. 12 and 13.

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an experiment made publickly before the Society of Arts, Commerce, &c. and which gave them a ſatisfactory demonſtration of the great difference in nature between Corallines and vegetable ſubſtances. It happened upon the following occaſion. A gentleman of Wales had ſent the ſociety a parcel of Lichen tartareus, of Linn. Ed. 2. Sp. Pl. 1608. as a proper material for dying a red colour, to anſwer the ſame purpoſe of that expenſive article among the dyers, called Orchell, or Canary weed, which is the Lichen Roccella of Linn. Sp. Pl. 1622.

As the object was of conſequence, the ſociety was very deſirous of being fully informed of the nature and appearance of this uſeful dye; and therefore, ſeveral curious gentlemen of the ſociety were deſired, againſt the next meeting, to bring ſome ſpecimens of true Orchell. Accordingly ſome ſpecimens were obtained from the Orchell dyers in Southwark, and laid before the ſociety.

At the ſame time Dr. Maningham, a member of that ſociety, produced before the ſociety a ſpecimen, in a paper with Orchell wrote upon it, from Mr. Miller of Chelſea, likewiſe as the true Orchell: but, upon examining it, it proved to be the Corallina nervo tenuori fragiliorique internodia nectente of Sir Hans Sloane's Hiſtory of Jamaica, Vol. I. Tab. 20. Fig. 4. Some diſputes ariſing on the different appearance of the ſpecimens, I took the liberty to inform the gentlemen preſent, that, having lately made ſome experiments on Corallines, I believed that Mr. Miller's ſpecimen was a Coralline, or animal ſubſtance, and the Lichen Roccella, or Dyers Orchell, was a vegetable; and in order to convince the ſociety of the

difference, I called for a lighted candle, and having firſt ſet fire to the Lichen Roccella, it yielded the ſame ſmell that burnt vegetables uſually do; but when the Coralline (which was Mr. Miller's ſpecimen) was burnt, it filled the room with ſuch an offenſive ſmell like that of burnt bones, or hair, that the door was obliged to be opened, to diſſipate the diſagreeable ſcent, and let in freſh air.

Another argument that Dr. Pallas offers the world of the vegetable nature of Corallines, or rather a proof of their not being of an animal nature, are Count Marſigli's Chemical experiments on the Corallina Officinalis (Hiſt. Mar. p. 73.) where he ſays it neither contains animal oil nor volatile ſalts.

But, to prevent ſuch plauſible arguments from miſleading mankind, I determined to have fair and accurate experiments made on this ſubſtance. Accordingly I applied to Mr. Peter Woulfe, F. R. S. a gentleman diſtinguiſhed for his great knowledge in chemiſtry; and in order to have the ſpecimens freſh from the ſea, I applied to a worthy member of this Society, the Right Honourable the Earl of Hillſborough, for Mr. Potts, the Secretary to the Poſt-Office, to procure me a ſufficient quantity of the Corallina Officinalis from the ſea-coaſt near Harwich: this parcel, about two months ago, I ſent to Mr. Woulfe; and in anſwer have received the following letter, with an account of his experiments made on it.

Clerkenwell,

Clerkenwell, May 5, 1767.

SIR,

I TOOK twelve ounces troy of the Corallina Officinalis (which you ſent me) picked clean from every extraneous ſubſtance, and put it into a clean ſtone-coated retort; the retort was ſet in a reverberatory furnace, and an adopter and quilled receiver luted to it: the fire was very gentle for the firſt eight hours; in which time, half an ounce and eighteen grains of a tranſparent and almoſt colourleſs liquor came over, which was ſet aſide for examination. The fire was then increaſed, and in ſix hours time there were diſtilled two drams and three grains of a turbid liquor, which had ſome appearance of oilineſs on its ſurface; this was likewiſe ſet a-part to be examined. The fire was then increaſed for ſix hours longer, and during the laſt two hours the retort was quite red hot all over, which ended the diſtillation. In this third and laſt proceſs the portion of liquor that came over was more turbid than the ſecond, and ſome of it from the redundancy of its volatile alkaly was cryſtallized; it alſo contained rather more than a dram of light empyreumatic oil, very much reſembling the ſmell of hartſhorn; in the recipient there was alſo ſome cryſtals of a volatile alkali. The whole of this laſt product weighed three drams and an half. The caput mortuum was quite black, and weighed ten ounces, one dram, and one ſcruple; ſo that there was a loſs of four drams and forty-nine grains out of the twelve ounces of Coralline.

The firſt liquor that diſtilled ſlightly effervesced with ſpirit of ſalt, and changed ſyrup of violets green, certain proofs of a volatile alkali.

The ſecond and third portion effervesced ſtrongly with ſpirit of ſalt, as did alſo the volatile ſalt that came over into the receiver, evident marks of its being a concentrated alkali.

Here I muſt obſerve, that had this diſtillation been conducted in a hurry, there would have been no concrete volatile alkali; for then this would have been confounded and diſſolved in the firſt liquor that came over.

Had there been a ſufficient quantity of this Coralline, I ſhould firſt have propoſed to have taken off the calcareous ſubſtance, by an acid menſtruum, and afterwards waſhed the membranaceous part ſo clean from the acid, as not to change the ſyrup of violets red.

Then the diſtillation of this part alone would have afforded a much larger proportion of empyreumatic oil, and volatile alkali, and but a very ſmall quantity of caput mortuum.

If you think theſe experiments of any uſe, you have my free leave to lay them before the Royal Society.

I am, Sir, yours, &c.

To John Ellis, Eſq;
in Grays Inn.

Peter Woulfe.

Doctor Pallas proceeds to prove that Corallines cannot be animals, as the * pores of their calcareous

* Pori autem calcareæ ſubſtantiæ ita ſunt minuti, ut polypi in iis hoſpitari nequeant. Pall. Elench. p. 419.

ſubſtances

ſubſtances are too minute for any polypes to harbour in. Theſe words of the Doctor's ſeem to imply, as if the Coralline ſubſtances were only habitations for detached polypes, and not part of the animals themſelves. How this affair ſtands, I hope to have clearly demonſtrated long before this, for I have plainly ſeen, and endeavoured to ſhew mankind, that the ſofter and harder parts of zoophytes are ſo cloſely connected with one another, that they cannot ſeparately exiſt; and therefore have not heſitated to call them conſtituent parts of the ſame body, and that the polype-like ſuckers are ſo many mouths belonging thereto.

Now, for the ſmallneſs of the pores, which the Doctor has mentioned here (among the Corallines) to be a contradiction to animal life; he certainly has forgot one circumſtance, when he introduces the Corallium pumilum album (Eſſay Cor. T. 27. *f. c.*) or his Millepora calcarea (Pall. Elench. p. 265.) as an animal, which is, that he there ſays, it has abſolutely no pores at all †.

As there can be no doubt, but every part of what is called Coralline is neceſſary to make out ſuch an animal, or being, it will be very difficult, if not almoſt impoſſible, to determine the proportion there ought to be between ſofter and harder parts; and therefore it cannot be thought unreaſonable to ſay, that in ſome of this tribe the ſtony parts are by much the greater part of the whole, eſpecially as Doctor Pallas's objection can be only againſt the cruſt, or lapideſcent part, as the inſide of many of them is far from being hard, being

† Pori omnino nulli. Pall. Elench. p. 266.

exactly

exactly like a Sertularia, ſo that I do not know if it would not be a good definition to one well acquainted with that tribe to ſay, a Coralline is a Sertularia covered with a ſtony or calcareous cruſt; if the mouths ſhould happen to be very ſmall, their number may make up that deficiency. We ſee in the greateſt number of Corallines their ſurface full of holes; we ſaw the ſame in Eſeharas and Milleporas thirty years ago; ſince that time magnifying glaſſes have been improved, ſo as to ſhew us, that they are all orifices, for polype-like ſuckers; why ſhould not we now admit that glaſſes may be ſtill more improved, ſo as even to make us able to ſee what may be the intention and uſe of theſe minute orifices, which according to all rules of reaſoning, we muſt ſuppoſe to approach in nature to them they are moſt alike. From this extreme minuteneſs then of the pores of theſe Millepora, confeſſed to be zoophytes, as well as thoſe of Corallina officinalis as before mentioned, it is no great matter of ſurprize, that Doctor Juſſieu could not perceive any animal life in the Corallines, nor Doctor Schloſſer in the Millepora calcarea. As theſe experiments ought to be attended with many convenient coinciding circumſtances that do not often happen to perſons who only go to the ſea-ſide, perhaps for a few days, or hours, ſo that it is unreaſonable to conclude, becauſe they have been unſucceſsful, that more accurate obſervers may not be more fortunate at another time.

I believe I ſhall be juſtified in this, by many eſſays that have been made, by perſons of judgment, to obſerve the polype-like ſuckers in many, even of the Sertulariæ, which they have ſeveral times attempted in

in vain; I muſt own it has often happened to me in many ſpecies, and yet I have not the leaſt doubt of their being true Sertulariæ from the ſimilarity there is in their habit and form to others of the ſame genus; and of this fact I am ſure Doctor Pallas is fully convinced.

Another argument made uſe of by Doctor Pallas, to overthrow the animal exiſtence of Corallines, is taken from Mr. Meeſe's aſſertion, that he had found on Bergummer Heath in Frieſland, a ſubſtance of the ſame nature with the Corallines. Meeſe, in his Flora Friſica, p. 75. calls it a Lichen; but Doctor Pallas has ventured in his Elench. p. 427. to rank it among the Corallines, under the name of Corallina terreſtris *. In this Doctor Pallas is in the right, as I have had an opportunity of examining a ſmall ſpecimen, that my worthy and learned friend Doctor Schloſſer of Amſterdam was ſo kind to procure me: but how ſuch a nice and accurate philoſopher as Doctor Pallas could let it eſcape him to conſider the nature and quality of this ſubject, and how much it differs from any thing elſe growing on the land, is a thing that ſurpriſes me. It only being mentioned by Mr. Meeſe, as found on Bergummer Heath, ought not to have ſatisfied him ſo far, as to declare a body with a calcareous cruſt to be a land production, when no ſuch thing in the whole vegetable kingdom has ever been found; it has always been thought quite the contrary, that a ſtony or hard ſubſtance of that nature, could not be produced, but from an animal, and chiefly thoſe that live under water †.

* See the figure of it in Tab. XVII. fig. 28.

† 'Tis worthy of our notice how eaſily this ingenious Natural Hiſtorian reconciles it to himſelf, that this inhabitant of the

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This ſhould certainly have made him minutely inquire in what manner it was found, if buried under moſs, looſe on the ground, or perhaps near ſome of the canals, which communicate with the ſea. Many accidents might have brought it thither, which is more probable than to imagine nature to go out of her uſual track.

It is not improbable that that part of Holland has been overflowed by the ſea, and this production left there when the water ſubſided, or blown there by a ſtorm, which I beg leave to believe till I am better informed. I do not in the leaſt doubt of Mr. Meeſe's veracity; but as that gentleman was more intent on diſcovering vegetables than animals, and thinking this very like a dry Lichen fruticuloſus, he did not ſcruple to believe it to be one of that tribe; and therefore, perhaps, neglected to obſerve all thoſe circumſtances, that we now wiſh to be informed of.

The irregular pedunculated figures or fructifications (as Doctor Pallas pleaſes to call what is repreſented in Tab. XVII. fig. 29.) ſeem to be rather a defect in the growth of the ramifications, eſpecially as they differ from one another in ſhape, and ſome of them appear beginning to form other branches.

In fig. *a* the whole conſiſts of two oppoſite curled proceſſes, with a ſmall cavity between them at the top; this cavity is filled up at fig. *b*. ſo that the top becomes rounded; in fig. *c*. *c*. there ſeems to be a beginning of a continuation lengthways; and in fig. *d*. it is ſtill more plain the beginning of a branch.

ſea can grow on dry land. See Pallas Zoophyt. p. 427. Nec magis miror Corallinam in ſicco creſcentem, quam Lichenum cum Fucis ſummam analogiam.

If

If the inſide of theſe proceſſes had been hollow, and the outſide of a regular figure, I ſhould not have heſitated to conſider them to be the ovaries of the Coralline; but as they are ſolid, and of the ſame ſtructure with the reſt of Corallines, I ſhall rather call them defective branches.

Doctor Pallas's laſt argument to prove that Corallines are vegetables is, that the nodules, or tubercles, which he has obſerved in Corallines, contain little ſeeds ſubanalogous, or ſomewhat reſembling thoſe we find in the fructification of the Fucus's and Confervas.

If this method of reaſoning ſhould hold good, what will become of the Cellularias, Sertularias, and Millepora calcarea & agariciformis, with many other zoophytes, that have ſuch roundiſh ovaries; they muſt be recalled to the vegetable kingdom, notwithſtanding all doubt about their being living animals has long been laid aſide.

I come now to his ingenious friend Doctor Baſter, who carries this matter ſtill farther, and ſays poſitively, in Phil. Tranſ. Vol. LII. p. 111. that the Corallines are true Confervas; and in his Opuſcula Subſeciva, Vol. I. Tab. I. fig. 3. A. and B. he refers us to the figure of the Corallina rubens in ſeed; which, he ſays, is a true Conferva; but the figure is ſo bad, that I am perſwaded nobody can find out what he means to repreſent by it.

I ſhall therefore conclude this letter, with recommending to theſe ingenious gentlemen, to analyſe theſe bodies chemically, and with care; and likewiſe to view them with the ſame attention, that I have done, in the microſcope; if ſo, I am

perſwaded they will be of our opinion. I muſt defer the ſequel of what I intended to another day, which was to give you an account of the diſcoveries I have made in the fructification of the Confervas; theſe, I flatter myſelf, will fully convince Doctor Baſter of the great difference between theſe two bodies, and that they belong to two different kingdoms of Nature.

I am,

SIR,

Your moſt obedient Servant,

Gray's-Inn, June 2, 1767.

John Ellis.

The Deſcription of Plate XVII.

Fig. 1. The Miriozoon of Donati, or Millepora truncata of Pallas.

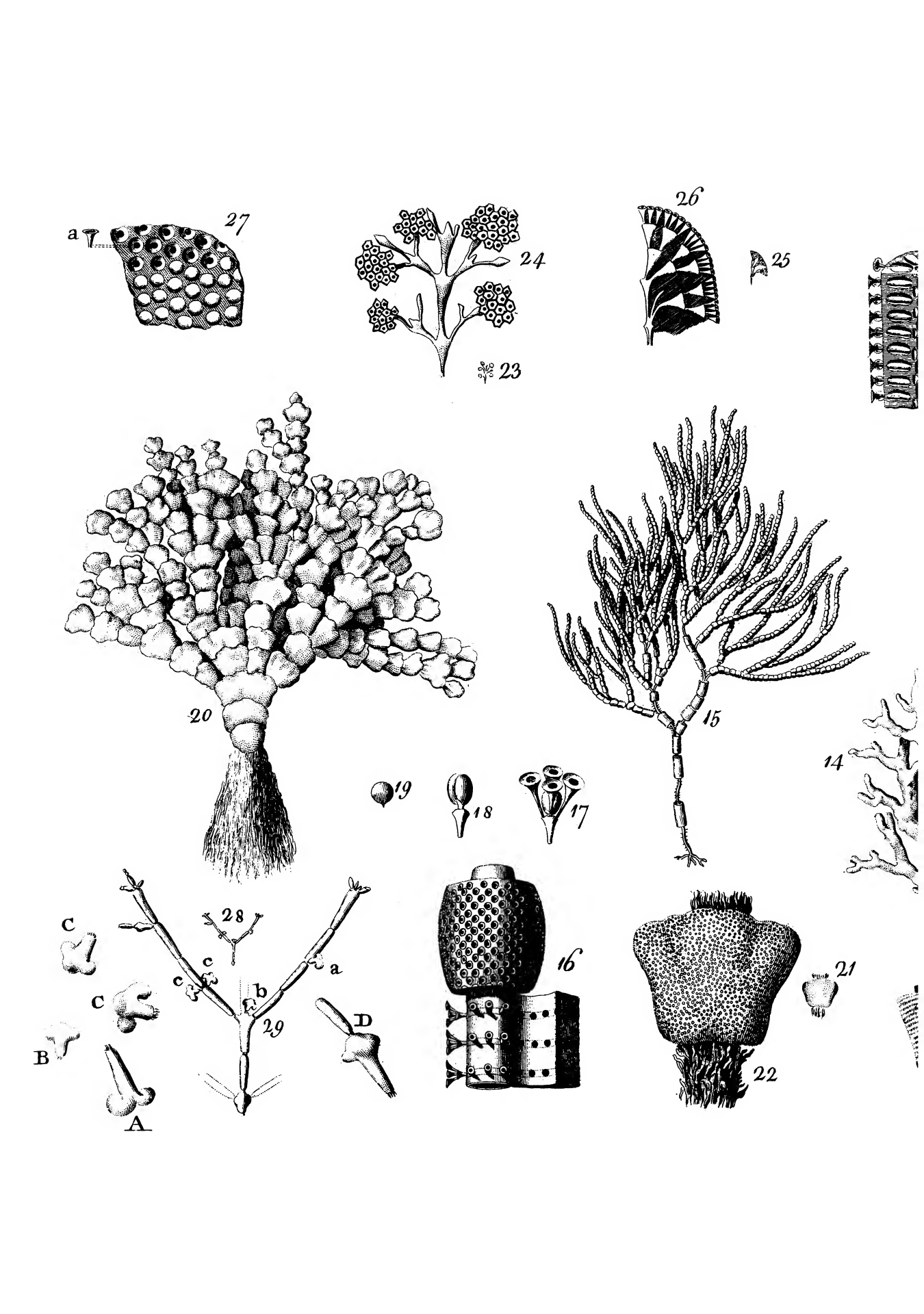
2. The end of a branch magnified, to ſhew the ſituation of the pores.

3. The ſame cut perpendicularly through, to ſhew the Trumpet-like ſuckers in their cells connected with the middle tubes.

4. The horizontal ſection of the ſame, with the ſuckers extended.

5. The magnified drawing of one of the ſuckers, with its cell and operculum.

6. The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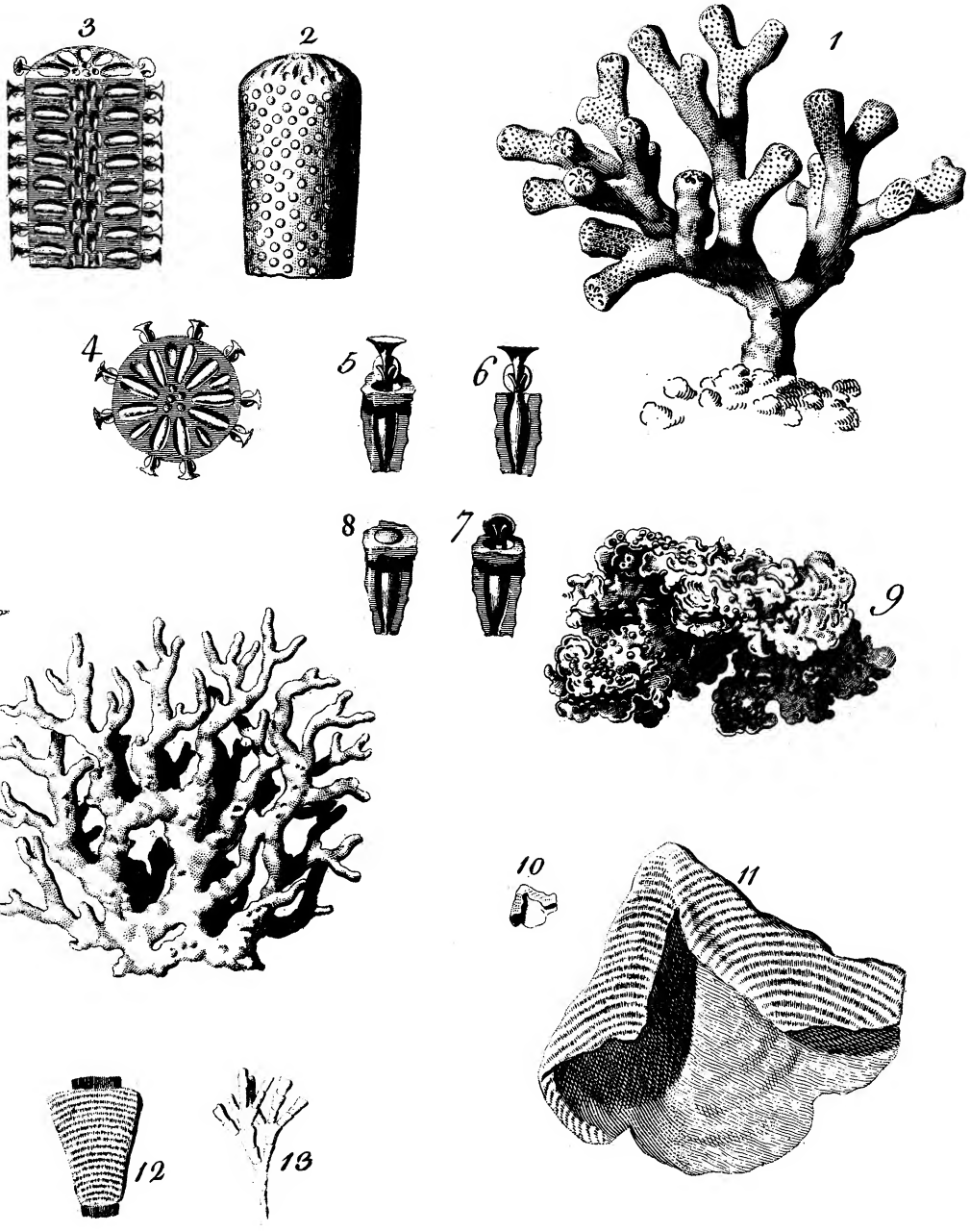
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Fig. 6. The oblique view of the opening of the cell with the ſucker and operculum.

7. The cell with the operculum open.

8. The cell covered with its operculum.

9. The Corallium Lichenoides of Ellis's Corallines, with ovaries upon it.

10. The natural and magnified ſize of a piece
and 11. of this Coral, to ſhew the arrangement of the inſide of the cells, which are juſt the ſame as in the following.

12. The order of the cells, in a joint of the Corallina Officinalis, to ſhew the great affinity between them.

13. The natural ſize of a ſmall piece of the Corallina Officinalis.

14. The milk-white Millepora calcarea, from the Mediterranean, where, though the pores are not viſible on the outſide, the arrangement of the cells in the inſide are the ſame with the Corallium Lichenoides, and Corallina Officinalis.

15. The Corallina Roſarium, or White-bead band-ſtring of Sloan's Hiſt. of Jamaica, Tab. XX. fig. 3.

16. Two joints magnified, one to ſhew the ſituation and figure of the pores, and the other to ſhew how the ſuckers paſs from the middle cartilaginous tube through the calcareous covering to the ſurface.

Fig. 17. Shews four of the ſuckers, and the ovary between them, magnified highly.

18. The Ovary.

19. One of the eggs taken out of the ovary.

20. The Corallina incraſſata, from the Weſt-Indies.

21. One of the joints of its natural ſize.

22. The ſame magnified a little, to ſhew its pores in its calcareous ſurface.

23. Part of the inſide tubes of the joint, of their natural ſize.

24. The ſame magnified, to ſhew the openings of the cells on the ſurface, connected together.

25. A perpendicular ſection of half of one of theſe joints.

26. The ſame magnified, to ſhew the figure of the veſſels leading to the ſuckers in the calcareous ſurface.

27. A piece of the calcareous ſurface highly magnified, to ſhew ſome of the pores open, and others covered with their convex opercula; letter *a* ſhews the figure of one of the trumpet-ſhaped ſuckers highly magnified.

28. A ſmall branch of Meeſe's Coralline ſuppoſed to grow on a heath, called by Dr. Pallas Corallina terreſtris.

29. The ſame magnified, to ſhew the diſpoſition and figures of its ſuppoſed fructification at *a. b. c c.* and *d.* which are higher magnified at A. B. C C. and D. to ſhew how unlike they are to fructifications.

SEQUEL.

Title read December 17, 1767.

Read Jan. 14, 1768. I COME now to anſwer Doctor Baſter, who aſſerts poſitively, in his memoir publiſhed in the Tranſactions of the Royal Society, Vol. LII. p. 111, that all the Corallines, which you and I have deſcribed, are plants of the genus of Conferva.

In order to explain myſelf, it will be neceſſary to let him know what I mean by a Conferva, and what I would be underſtood by a Coralline, according to your ſyſtem.

By a Conferva I mean a plant with jointed filaments, either ſingle or branched, bearing fruit, which are diſpoſed in different ways: in Latin, thus,

Conferva eſt planta, cui ſunt filamenta articulata, vel ſimplicia vel ramoſa, fructificationes vario modo diſpoſitæ habentia.

By a Coralline I mean an animal growing in the form of a plant, whoſe ſtem is fixed to other bodies. The ſtem is compoſed of capillary tubes, whoſe extremities,

tremities paſs through a calcareous cruſt, and open into pores on the ſurface. The branches are often jointed, and always ſub-divided into ſmaller branches, which are either looſe and unconnected, or joined, as if they were glued together: in Latin, thus,

Corallina eſt animal creſcens habitu plantæ.

Stirps fixa, e tubis capillaribus per cruſtam calcaream poroſam ſeſe exerentibus compoſita.

Rami ſæpe articulati, ſemper ramuloſi, vel divaricati liberi, vel conglutinati et connexi.

This difference then will evidently appear by putting each kind into an acid liquor. The Coralline will immediately diſcover the nature of its * calcareous ſurface, by a ſtrong fermentation; when the Conferva will not appear in the leaſt affected. This acid liquor will likewiſe ſoon diſſolve the calcareous ſubſtance in the Coralline, by which means the minute veſſels that lead to the pores on the ſurface will become viſible; whereas the Conferva will unalterably remain the ſame, and be rather preſerved than corroded by the acid.

When Doctor Pallas, who ſupports the opinion of Doctor Baſter, comes to the chemical analyſis of the Corallines, he tells us † that he had not time nor opportunity to try them; but depends on the report of other authors.

* Lin. Syſt. Nat. Ed. 12. p. 1304. "Corallinas ad regnum animale pertinere ex ſubſtantia earum calcarea conſtat, cum omnem calcem animalium eſſe productum veriſſimum ſit."

† Pallas Zooph. p. 418. "Temporis anguſtia et opportunitas impediverit ne in Corallinarum naturam accuratius igne inquirerem."

This

This dependance on the authority of others, to overturn what I think we have eſtabliſhed with very ſtrong evidence, will, I am in hopes, convince him of the propriety of that well-choſen motto of the Royal Society. "Nullius in verba;" which I find he has adopted as the common ſeal of his epiſtles to his literary correſpondents: and he will now have a further opportunity of * complimenting Doctor Baſter on making a ſecond apology for what he has advanced againſt me in the Phil. Tranſ. Vol. LII. p. 111. by ſhewing him, that they have both been miſtaken in blending two very different genera of the animal and vegetable kingdoms of nature together.

To make this difference appear ſtill more evident, I come now to lay before you a new ſcene of nature; which an accurate examination into the fructification, as well as the articulations, of ſome of the Confervas, afforded me. Indeed the minuteneſs of theſe objects would ſcarce ſeem worth while to examine into ſo critically, if my reputation had not engaged me to ſhew the wide difference between them and Corallines. This, joined to ſome remarkable diſcoveries, which I made in the year 1754 on the coaſt of Suſſex (in company with Mr. G. D. Ehret, F. R. S.) in the fructification of this claſs of plants, which

* Pallas Zooph. p. 20. "Candidiſſimus Baſterus, qui hucuſque contra Elliſium reliquoſque prioris ſententiæ patronos ſteterat, alterius evidentiæ victas dedit manus, et glorioſiſſimo exemplo, repudiata priori ſua opinione, veram theoriam acriter defendere cœpit."

before that time were eſteemed by * botanical writers to have no fructification at all, has induced me to lay a few ſpecimens of them with their magnified drawings before the Royal Society.

In examining theſe plants I was amazed to find two ſpecies of them evidently of your claſs of Dicœcia; that is, male parts of fructification on one, and female on the other.

The firſt of theſe is the Conferva polymorpha, where in Tab. XVIII. at fig. *a*. is repreſented a very ſmall branch of the female in its natural ſize, and at fig. A. the ſame is magnified: in the tranſparent capſules of this ſpecimen, we can eaſily diſcover the ſeed as it lies expanded in a watch-glaſs in water. Letter *b*. repreſents the natural ſize of a ſmall branch of the male. Letter B. the ſame branch magnified, ſhewing its amentaceous flowers, or catkins, with its minute male ſeed in ſpikes. B 1. ſhews one of them highly magnified.

The other Conferva is the Plumoſa, and is one of our moſt elegant ſub-marine plants. Fig. *c*. repreſents the natural ſize of a minute ſprig of the female. At fig. C. the ſame is magnified, where the ſeeds appear in their capſules. The fig. *d*. ſhews the natural ſize of a ſprig of the male Conferva plumoſa; and fig. D. the ſame ſprig magnified, ſhewing the ſpikes of male ſeed.

* Ray, Synop. Ed. 3. p. 57. "Conferva eſt Muſci genus "ſterile et capitulis floridis deſtitutum, immo nec peltis & tu- "berculis, quæ horum loco aliqui gerunt, donatum, ex meris "foliis teretibus et uniformibus ſeu mavis cauliculis, in tenuia "capillamenta diviſis, conſtans."

The

The next is the Conferva floſculoſa, and is repreſented at fig. *e.* in a branch of the natural ſize. Fig. E. is the ſame magnified. This is one of thoſe remarkable Confervas that has footſtalks to its flowers or fructification. It appears to have fruit like a ſtrawberry, or raſpberry, ſurrounded by a leafy calyx.

This was found on the ſea-coaſt, near Yarmouth in Norfolk, by my worthy friend George Whatley, Eſquire, in the year 1764. When it was freſh, it was of a moſt vivid carmine colour. The other with flowers, at fig. *f.* is the Conferva geniculata. Fig. F. ſhews the ſame branch more diſtinctly, being magnified with flowers ſurrounding the joints; this, with one which I have called in my catalogue of Confervas, Conferva florifera, I diſcovered in the year 1754 near Brighthelmſtone in Suſſex, when Mr. Ehret was ſo kind as to make drawings of them while recent. The colour of this, when freſh, is a fine ſcarlet.

The Conferva plumula, at fig. *g.* is one of the ſmalleſt of the tribe, but moſt elegantly feathered; it is of a pale red colour. The ſame is magnified at fig. G. which ſhews the order that the fruit and branches are diſpoſed in. G 1 ſhews the fruit or ſeeds, which are of a red colour, ſurrounded by a clear gelatinous pulp.

The Conferva at fig. *h.* I have called Ciliata, from the circle of ſmall fibres at the top of each joint. The magnified drawing at fig. H. ſhews theſe fibres like a crown on each joint. This was inſerted here to ſhew, with the reſt, ſome of the infinite variety of beautiful forms, which the great Author of nature has impreſſed even upon one of the loweſt claſſes of he vegetable tribe.

Before I conclude, I muſt obeſerve;

That as Doctor Pallas has likewiſe introduced among his arguments, that the fruit of the Fucus's are ſubanalogous to thoſe of the Corallines, I could introduce an infinite variety to ſhew the great difference there is between them; but this part of natural hiſtory, too long neglected, requires a volume by itſelf, to ſhew the amazing variety of vegetables, that lie hid from us in the great deep; I may make ſome obſervations on them the ſubject of a future letter, eſpecially as many of them are of the claſs of Dicœcia, as well as thoſe which I have already ſhewn in the Confervas; which I believe will be new to the botaniſts.

I am,

Dear Sir,

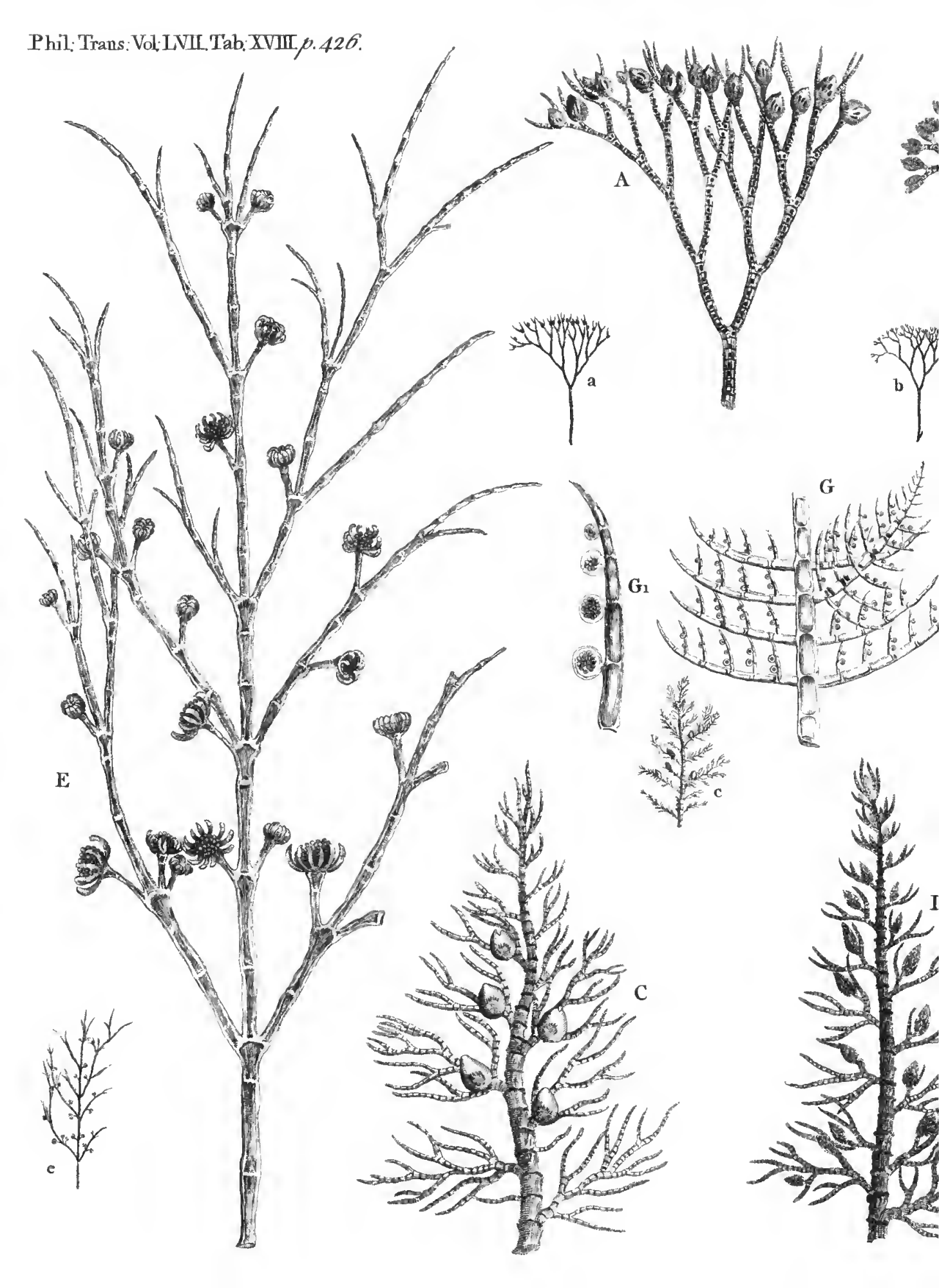
Your moſt obedient ſervant,

John Ellis.

The Deſcription of Plate XVIII.

Fig. *a.* The female Conferva polymorpha.
A. The ſame magnified, to ſhew the ſeeds in the Capſules.
b. The male Conferva polymorpha.
B. The ſame magnified, with its male flowers.
B 1. One of the catkins, or male flowers, highly magnified.
c. The female Conferva plumoſa.

The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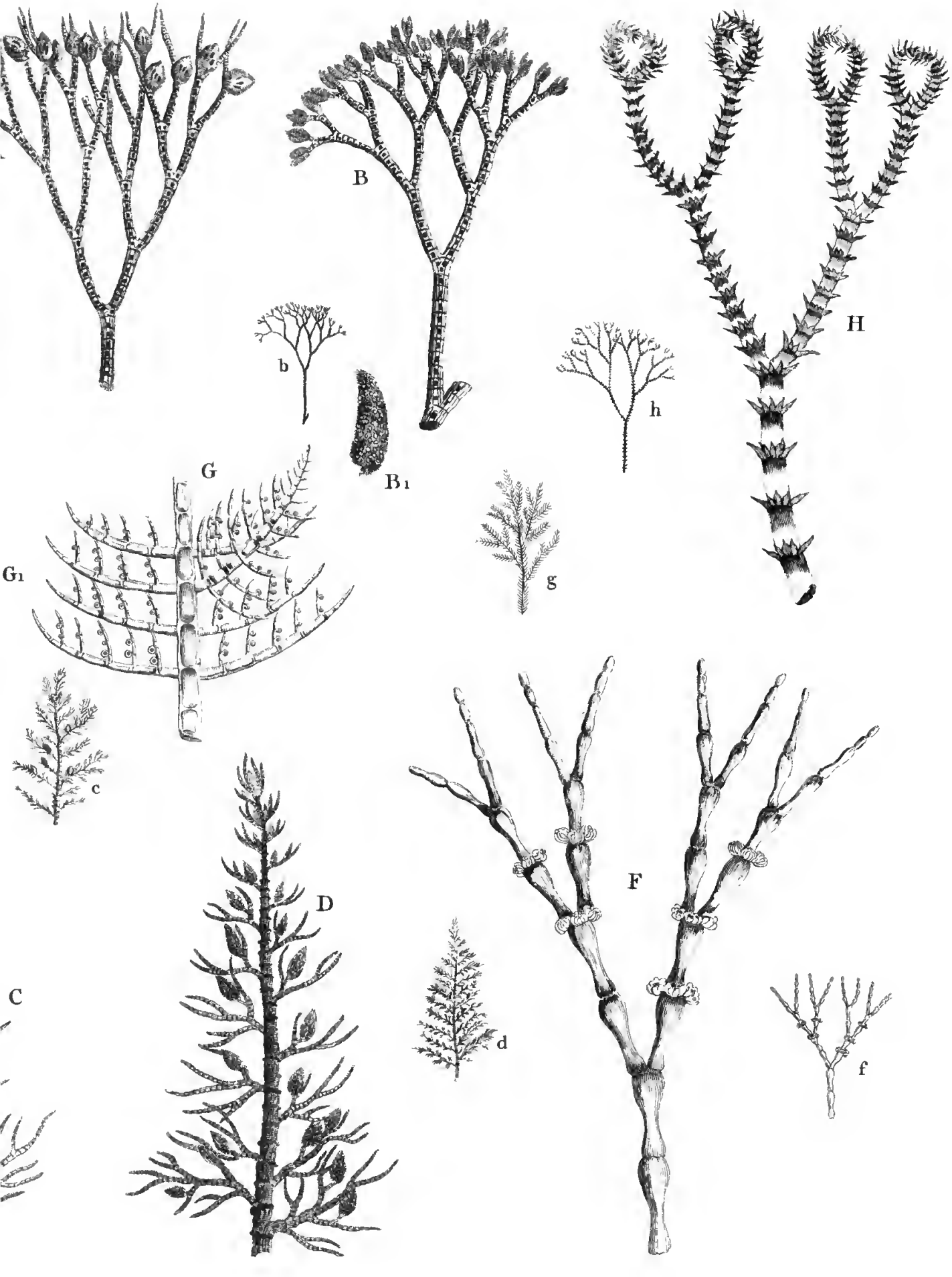
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Fig. C. The ſame magnified, to ſhew its fructification.

d. The male Conferva plumoſa.

D. The ſame magnified, ſhewing its catkins, or male flowers.

e. Conferva floſculoſa.

E. The ſame magnified, ſhewing its pedunculated flowers, or fruit, with their polypetalous cups.

f. Conferva geniculata.

F. The ſame magnified, to ſhew its flowers ſurrounding the joints.

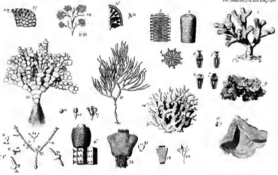
g. Conferva plumula.

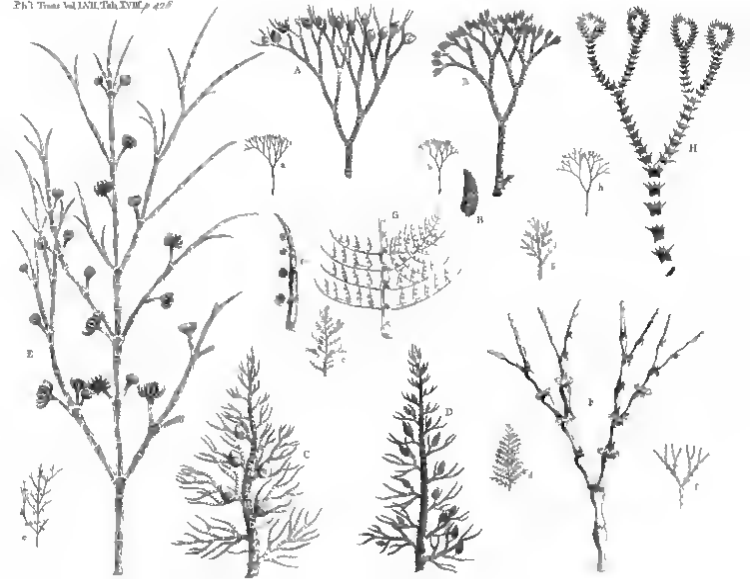
G. Part of it magnified, to ſhew the diſpoſition of its branches.

G 1. Some of the fruit highly magnified, to ſhew its ſeeds, ſurrounded by a clear viſcid pulp.

h. Conferva ciliata.

H. The ſame magnified, to ſhew the little coronets on the joints.

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